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NATIONAL SYSTEMATICS LABORATORY REPORT FOR CALENDAR YEAR 1988

Washington, D.C.

June 1989

U.S. DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

National Marine Fisheries Service

ANNUAL REPORT
NATIONAL SYSTEMATICS LABORATORY
CALENDAR YEAR 1988

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U.S. DEPARTMENT OF COMMERCE
Robert Mosbacher, Secretary

National Oceanic and Atmospheric Administration
William E. Evans, Acting Assistant Secretary for Oceans and Atmosphere

National Marine Fisheries Service
James W. Brennan, Acting Assistant Administrator for Fisheries

1988 HIGHLIGHTS

• Received award from NMFS for "Best Paper" in the 1987 *Marine Fisheries Review* for a contribution on identification of lobster tails. This paper was expanded and published as a book in 1988.

• A Systematics Laboratory paper on the gamba prawn genus *Pseudaristeus* received an "Honorable Mention" in the competition for best paper in the *Fishery Bulletin.*

• Published "Illustrated key to penaeoid shrimps of commerce in the Americas."

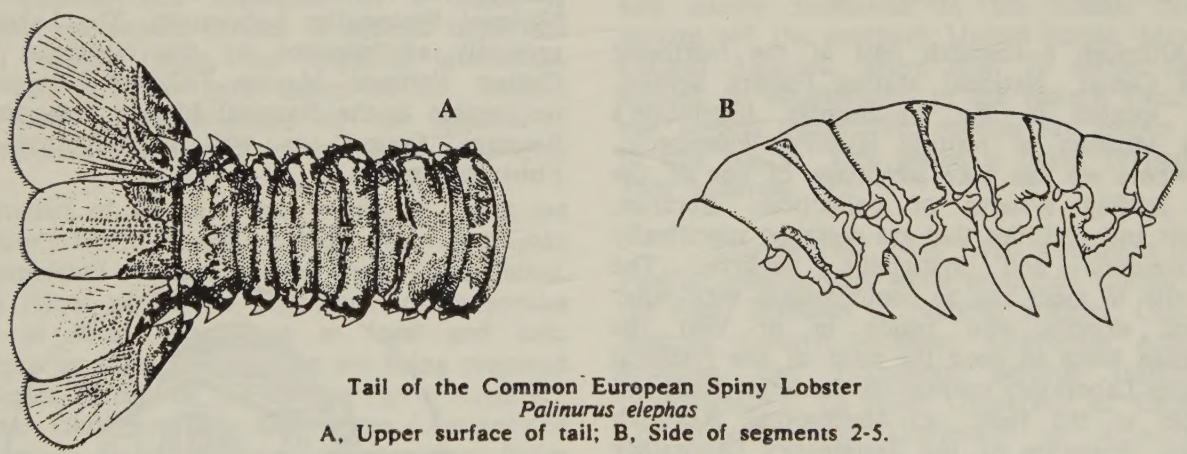
• Presented an invited plenary lecture to the VI Congress of European Ichthyologists in Budapest.

• Laboratory Director spent two months in the Indian Ocean on a Soviet research vessel.

• Participated in an international workshop on cephalopod systematics and biogeography.

• Observed oceanic cephalopods *in-situ* from a manned submersible.

• Participated in marine resource surveys off the Atlantic coast.



Tail of the Common European Spiny Lobster
Palinurus elephas
A, Upper surface of tail; B, Side of segments 2-5.

MISSION

The National Systematics Laboratory conducts taxonomic research on marine organisms of economic and ecological value to the United States. This involves describing and naming new species as well as revising existing names and descriptions based on new information. Because many species commercially important to the United States are widespread or migratory, our research is world- wide.

Accurate taxonomic information is critical for the proper management of our nation's marine resources. Without a clear understanding of what individual species look like, where they live and what their names are, we cannot collect accurate statistics, develop reasonable national fishing and conservation regulations, set catch limits, or understand the behavior and ecology of these valuable species.

The Systematics Laboratory is actively involved in studying the taxonomy of fishes, crustaceans, squids and corals. We have a permanent staff of four scientists, a scientist emeritus, three technicians, a scientific illustrator, an administrative assistant, and a secretary. Additional personnel and guest scientists that are occasionally assigned on a temporary basis are listed along with the permanent staff at the end of this report.

Although a research unit of the Northeast Fisheries Center, National Marine Fishery Service, we are located in the Smithsonian Institution's National Museum of Natural History, Washington, D. C., where we can take advantage of one of the world's leading systems of collections, libraries, equipment and facilities that are designed specifically for taxonomic and systematic research. The opportunity to meet and to communicate with other taxonomic experts who reside in or visit the Smithsonian helps to keep the staff of the National Systematics Laboratory current on the latest ideas and techniques in the field. As Smithsonian Research Associates, Scientists of the Systematics Laboratory expand Smithsonian scientific capabilities and help build and curate Smithsonian collections.

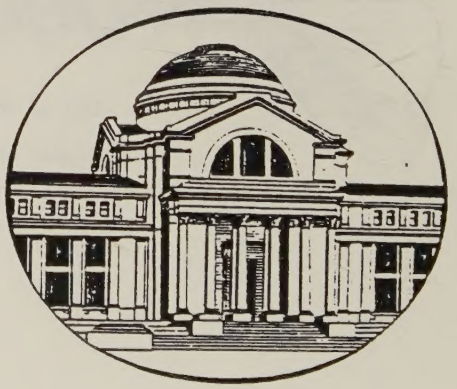
The Systematics Laboratory has two major responsibilities, research and service. Our research produces two principal products: 1) worldwide and regional taxonomic monographs, and 2) various aids to identification.

The Systematics Laboratory serves many public as well as private institutions and individuals worldwide by providing expert identifications and information on species we study. We also review and comment upon manuscripts for scientific journals and for colleagues in the National Marine Fisheries Service, other agencies, and academia. Our staff evaluates research proposals for the National Science Foundation, Sea Grant, and similar research funding agencies.

In addition to these activities, staff members serve as officers of various scientific associations and participate in university affairs as research associates and adjunct professors.

HISTORY

The origin of the National Systematics Laboratory can be traced back to 15 August 1942, when Samuel F. Hildebrand moved into the Division of Fishes of the National Museum of Natural History to continue his ichthyological research for the Department of the Interior's Bureau of Fisheries; this followed the merger of the Bureau of Fisheries fish collection with that of the U.S. National Museum. The Laboratory, then the National Center for Systematics, was transferred from the Department of the Interior to the National Oceanic and Atmospheric Administration in 1970 and renamed the National Systematics Laboratory. The Laboratory is presently administered by the Northeast Fisheries Center, National Marine Fisheries Service, but is responsible to the National Marine Fisheries Service Research Council as well as all four regional Fisheries Centers.



The National Museum of Natural History

RESEARCH

Eleven papers were published by NSL scientists in calendar year 1988 (listed at end of this report). Research completed in 1988 and earlier has led to 23 more papers that are now in press or that are being reviewed. Major accomplishments in 1988 are listed below for each investigation.

FISHES

Pelagic fishes of great importance to man live in the highly productive surface layers of the ocean where species tend to grow large and range widely. Emphasis is devoted to studying the anatomy and systematics of scombroids, the group that includes the tunas, Spanish mackerels, bonitos, and mackerels. Although many of the species have been known for a long time and an extensive literature treats them, detailed anatomical descriptions and comparisons are few, incorrect scientific names are often used, geographical ranges for many are not precisely delimited, and poorly documented classifications are current. The giant tunas, bonitos and Spanish mackerels found around the world have been treated by Dr. Collette and colleagues in a series of monographs and papers. Studies of another important group of pelagic fishes, the clupeoids (anchovies, herrings and sardines) have begun by Dr. Thomas Munroe with an investigation of the species of Spanish sardines (*Sardinella*) in the Gulf of Mexico.

Studies of several other groups of fishes are also under way. These include the halfbeaks (Hemiramphidae) and needlefishes (Belonidae), abundant fishes which are important forage species and are of local importance as food and bait. Monographs on these two families are being prepared for the series, "Fishes of the western North Atlantic". Also under study are the sand lances (*Ammodytes*) of the western North Atlantic and the tonguefishes (*Symphurus*).

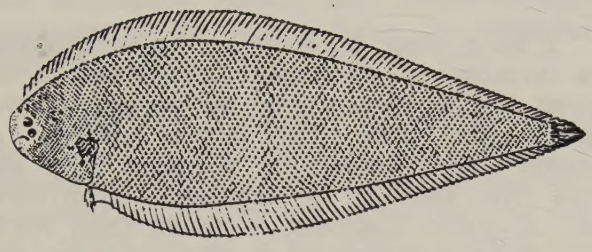
1. **Revision of *Fishes of the Gulf of Maine*—** A revision of Henry B. Bigelow and William Schroeder's classic 1953 volume *Fishes of the Gulf of Maine* is underway by Drs. Bruce B. Collette and Grace Klein-MacPhee. Through the cooperation of the Woods Hole Laboratory, the food-habits parts of the revised sections on flatfishes, cods, and mackerel-like fishes were rewritten in 1988. New information on age, growth, and maturity will be added to the accounts for the most important 15 species of these three groups in 1989. Drafts of revised accounts on bluefish, striped bass, white perch, and sea bass were produced during the year. Specialists on a number of groups of fishes - sharks, skates, killifishes, silversides, sticklebacks, seasnails, and tilefish - have agreed to update these sections of Bigelow and Schroeder using diskettes of the original text that we have produced with the use of an optical scanner.

2. **Sand lance taxonomy—** An investigation of the taxonomy of sand lance (*Ammodytes*) in the northwest Atlantic demonstrates the presence of two species in this area. The inshore species, *A. americanus* DeKay, occurs in protected bays and estuaries from Delaware to Labrador. The offshore species, *A. dubius* Reinhardt, is found from North Carolina to Labrador, mostly in offshore waters, but it sometimes occurs inshore with *A. americanus*. The offshore species has higher counts of lateral plicae, vertebrae, dorsal, anal, and pectoral rays and gill rakers. Numbers of lateral plicae separate more than 98% of specimens examined at 124 vs. 125 plicae. A manuscript completed in 1988 will be submitted to the *Fishery Bulletin* in 1989.

3. **Tonguefish taxonomy—** Tonguefishes (*Symphurus*) are an abundant group of small to medium-sized flatfishes that comprise significant portions of the demersal fish fauna inhabiting sandy and muddy substrates of the coastal continental shelves off the southern United States, Mexico, and Central America. More than 20 names have been applied to tonguefishes in the eastern Pacific alone, and several undescribed species are known to occur in this region. This genus is being revised by Dr. Tom Munroe.

During 1988, over 1,700 specimens of eastern Pacific tonguefishes were examined during visits to the Field Museum of Natural History, Chicago; Los Angeles County Museum; California Academy of Sciences, San Francisco; Scripps Institution of Oceanography, La Jolla; University of California at Los Angeles; and University of Arizona. Many unidentified specimens were brought back to the Systematics Laboratory, identified, radiographed, and included in analyses of meristic summaries for individual species. These data will comprise a general revision of eastern Pacific tonguefishes. Also, data from these specimens were incorporated into a survey of interdigitation patterns of symphurine tonguefishes. A manuscript describing these patterns was drafted and reviewed. One new eastern Pacific species was found, and a manuscript describing this species was submitted and accepted for publication. Descriptions of six other new species are now in preparation. Comparative study of *S. melanurus* is

enabling correction of nomenclature for this species. These problems and their solution were detailed in a manuscript drafted and submitted for review.



Blackcheek Tonguefish
Symphurus plagiusa

Additional *Symphurus* work includes preparation of a paper revising the eastern Atlantic species (two previously undescribed) for presentation at the annual meeting of the American Society of Ichthyologists and Herpetologists in 1989. Comparative material of Indo-West Pacific species was borrowed, identified, radiographed, and counted, in preparation for revisionary studies of species occuring in the region.

4. **Fishes of Walters Shoals**— Walters Shoals is a shallow-water seamount 400 nautical miles south of Madagascar and 600 nm east of South Africa. The shallow-water fishes of Walters Shoals were sampled with a number of techniques during cruise 17 of the Soviet oceanographic vessel *Vityaz*. This area had not been sampled before so Dr. Collette and Dr. N. V. Parin, chief scientist on the cruise, decided to write a joint paper on the fish fauna. Walters Shoals is part of a chain of 7 islands and seamounts that extend along the West Wind Drift from Tristan da Cunha in the South Atlantic to Amsterdam and St. Paul in the Indian Ocean. The shallow-water fish fauna of Walters Shoals consists of about 19 species. Three of these are endemic to the entire chain, another is found only at the four Indian Ocean seamounts and islands, and one, apparently undescribed, is known only from Walters Shoals. A paper is being prepared for presentation at the annual meeting of the American Society of Ichthyologists and Herpetologists in San Francisco in 1989.

CRUSTACEANS

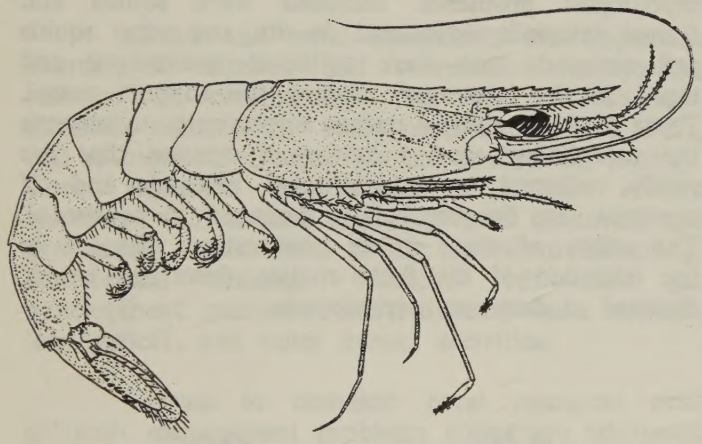
The groups of crustaceans most directly important to fisheries are the shrimps (mainly penaeoid species), lobsters and crabs. Research on shrimps in the National Systematics Laboratory is conducted by Dr. Isabel C. Canet (Pérez Farfante), and that on crabs, lobsters, and other decapods by Dr. Austin B. Williams.

The shrimp fishery is the most valuable single segment of the U.S. fishing industry. In 1988, domestic commercial landings amounted to 330,873 million lbs (heads-on-weight) with an ex-vessel value of $506,034 million, and an additional 598,210 million lbs (heads-off), with a value of $1,754,701 million (FOB), were imported. To satisfy this great demand, more species have been added to the list of commercially valuable shrimps during the last few years, and new beds have been exploited both in nearby and distant regions, in both shallow and deep waters. Wise management efforts and meaningful ecological and physiological studies require thorough knowledge of the systematics of these crustaceans.

Crabs and lobsters are among the most conspicuous animals in catches from heavily fished marine waters of the world. In combination, they yield about half of the tonnage of domestic U.S. crustacean fishery production and nearly half of its dollar value. In their adult phase they are prominent members of bottom communities, ranging from marshlands and estuaries through nearshore systems to the deep sea, and they occupy dominant positions in the biological communities where they live. A huge literature exists for some species that are seemingly well known, although questionably identified. Because of faulty, oversimplified descriptions, distribution ranges and community relationships of many such species may be poorly depicted and understood. Still other species have been lumped uncritically together, and many have never been recognized and described.

1. **Lobsters of the world in U.S. trade published**— A revision of A. B. Williams' (1987) "Lobsters: Identification, world distribution, and U.S. trade" *Mar. Fish. Rev.* 48(2):1-36, was issued by Osprey Books. The original article, which received the award for "Best Paper" in *Marine Fisheries Review* for 1987, was reformatted and adapted to a wider non-professional readership by inclusion of an introductory section on common names, a larger type-face, distribution maps for individual species, pictures of whole lobsters, a section on freshwater crayfishes, and a check-list of species in the groups discussed.

2. **Shrimp key published**-- "Illustrated key to penaeoid shrimps of commerce in the Americas" was published as *NOAA Technical Report NMFS* 64. Thirty-seven species of penaeoid shrimps, belonging to 12 genera and 4 families, are taken commercially in American waters. The keys are based on easily recognizable characters. Accompanying scientific names are the most frequently used vernacular names, maximum length attained by each sex, and geographic and bathymetric ranges. The booklet includes 49 figures and a glossary of terms useful in shrimp identification.



Yellow Roughneck Shrimp
Trachypenaeus similus

3. **Honorable mention for gamba prawn revision**-- Dr. Isabel Pérez Farfante received an "Honorable Mention" in the 1987 "Best Paper" competition of the National Marine Fisheries Service for her paper "Revision of the gamba prawn genus *Pseudaristeus*, with descriptions of two new species (Crustacea: Decapoda: Penaeoidea)" published in *Fishery Bulletin, U. S.* 85(2):311-338. This widely-ranging group includes six species; two of them were previously unknown to science and a third was known only as juveniles; five have commercial potential. The large series, obtained mostly from surveys by U. S. vessels in the Pacific, has made possible the assignment of taxonomic status and interrelationships of these prawns based on numerous new diagnostic characters.

4. **Deep-water crustacean paper published**-- "Notes on decapod and euphausiid crustaceans, continental margin, western Atlantic, Georges Bank to western Florida, USA", *Fishery Bulletin, U.S.* 86(1):67-76, treats 26 species of decapod crustaceans in 16 families plus one species of euphausiid from the outer continental shelf, submarine canyons, and nearby slope of the eastern and southeastern United States. Material was collected on surface and submersible vessels during exploration conducted through Lamont-Doherty Geological Observatory, Rutgers University, Northeast Fisheries Center, Southeast Fisheries Center, (Panama City, FL, and Pascagoula, MS).

5. **Common and scientific names of invertebrates**-- An American Fisheries Society (AFS) Committee on Common and Scientific Names of Aquatic Invertebrates has been working for several years to foster preparation and publication of a list of names for North American invertebrates that will parallel the well-known AFS "List of common and scientific names of fishes for the United States and Canada", now in its fourth edition. The list of decapod crustaceans has now been completed, largely though the efforts of Dr. Austin B. Williams and a committee of experts.

6. **Hydrothermal-vent crustaceans**-- Hydrothermal vents, as well as cold brine and hydrocarbon seeps in the world oceans have become major foci of oceanographic discovery and research in the past 10 years. With the aid of increasingly sophisticated exploratory techniques and equipment operated by NOAA and other agencies, these features have come to be recognized as major features of spreading zones in the ocean floors. The vents have been in existence since very early in the earth's history, and through geological and biological processes have had a profound influence on oceanic waters. Through time, representatives of many organismic groups have adapted to unique systems of nutrition in these environments at depths beyond the reach of light, and among the groups represented are decapod crustaceans. From the first discovery of the vents, Dr. Williams has been describing decapods collected from them in a series of papers. One paper was published and two submitted in the past year, and still others continue in preparation as discovery unfolds.

7. **Fossil hydrothermal vents**-- Fossil warm springs in deposits of the Late Cretaceous Western Interior Seaway, now in South Dakota, have yielded fossil crabs. Drs. Austin Williams and Gale Bishop of Georgia Southern College, have completed draft manuscripts on these crabs and on preservational aspects of fossil ghost shrimps and other crabs, the most numerous fossil decapod crustacean remains, from other deposits of the same age.

SQUIDS

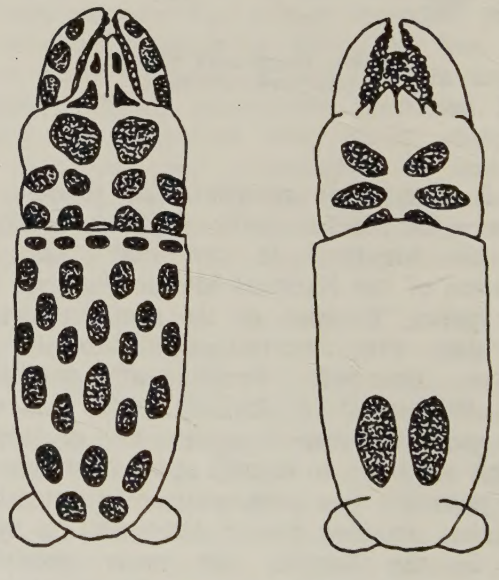
Squid fisheries, both in U.S. waters and worldwide, concentrate on species from two families, Loliginidae and Ommastrephidae. In the United States, these fisheries currently are primarily an export industry, although utilization in the U.S. is increasing.

Loliginids include many species of demersal squids which attain medium to large sizes and which are both common and abundant on continental shelves. The loliginids in U.S. waters include species that are harvested commercially (19,075 metric tons from the east-coast U.S. fishery in 1988, and 22,000 tons from the California fishery) but which are quite difficult to identify. Additionally, there are several other species of small loliginids found in U.S. waters. Generic relationships of the species are presently very confused. Four conflicting classification schemes have been proposed, based on single characters, on regional material, or on arguments that have been institutionalized in outdated literature. Because the diverse family Loliginidae is cosmopolitan, the only way to resolve relationships within it adequately is by a worldwide systematic review of the taxonomic characters. Dr. Michael Vecchione served as Working Group Leader of Loliginidae during a workshop on cephalopod systematics, described below.

Commercially and ecologically, the most important ommastrephids in U.S. waters belong to the genus *Illex*. The catch of *Illex* in U.S. waters in 1988 (1967 metric tons) was limited because of market domination by large catches of *Illex* from the Falkland Islands. There are four groups of *Illex* in the western Atlantic which are more or less distinct morphologically. It has been proposed that these morphotypes are separate species, although some authors still consider them to be subspecies. These arguments, based primarily upon preserved specimens, have not fully considered other components of morphological variability (e.g. geographic, seasonal; sexual, ontogenetic). Dr. Vecchione is conducting a study of *Illex* which will treat several components of variability from fresh as well as preserved material.

1. **Cephalopod workshop held—** An International Workshop, with 31 participants from 12 countries, on Systematics and Biogeography of Cephalopods, co-sponsored by the Smithsonian Institution and George Washington University, was conducted 11-25 July in Washington, DC. The workshop, centering on specimen-oriented research, was organized into 7 working groups, each focusing on an important cephalopod family in need of systematic revision. Dr. Michael Vecchione led the working group for Loliginidae which arrived at a genus-level classification for 42 currently recognized species. He also chaired sessions on analyses of systematic characters for cephalopods, and presented a paper on use of ontogenetic characters for cephalopod systematics. Workshop results will be published in Smithsonian Contributions to Zoology, to be co-edited by Dr. Vecchione, Nancy Voss of the University of Miami, and Dr. Ron Toll of the University of the South.

2. **Observations on live deep-sea cephalopods—** Dr. Michael Vecchione, together with Dr. Clyde Roper of the Smithsonian Institution, presented videotapes of bathypelagic and benthopelagic cephalopods to several organizations during the year. The videotapes were obtained from several other researchers studying various non-cephalopod problems. Included were squids and finned octopods videotaped *in-situ*, and other squids and octopods that were collected undamaged and taped in the laboratory aboard the support vessel. These methods allow a unique opportunity to observe the morphology and behavior of species that are rarely collected by conventional methods and, if captured, are frequently too damaged to be useful. The utility of these direct observations has led to the initiation of the field studies, described below, directed at deep-sea cephalopods



Paralarval Squid
Loligo plei

3. **Paralarval studies—** Developmental changes in cephalopod morphology are important for several reasons. Description of paralarval stages allows

future studies to delineate spawning areas and seasons, to assess standing stocks, and to determine factors involved in recruitment processes for a species. Furthermore, ontogenetic characters can provide important information on systematic relationships among taxa. Studies on the paralarval development of cephalopods are continuing along several interrelated lines of inquiry.

4. **Cephalopod key in press**— An annotated key to the 13 species of cephalopods of the northeastern U. S., including illustrations of these species, a fully illustrated glossary, and a complete checklist of the 120 species recorded from nearby waters, is in press as *NOAA Technical Report* 73.

CORALS

Corals and coral ecosystems are important sources of esthetic and recreational enjoyment, habitat for commercially harvested finfish and shellfish, material for curio items and objects d'art, and specimens for scientific and educational inquiry. Coral resources are subject to adverse effects associated with channel dredging, vessel anchoring and groundings, recreational diving, specimen collecting, commercial fishing, offshore oil and gas development, municipal and industrial waste outfalls, land runoff, and other human activities.

Threats to domestic coral resources pose difficult management problems which are addressed currently through a patchwork of state and federal regulatory and management programs. Foremost among these programs are those concerned with managing state and federal parks, marine sanctuaries, commercial fisheries, offshore mineral development, and coastal zone development.

Efficient management and regulation and accurate ecological and physiological research depend on a thorough knowledge of systematics. Early taxonomic workers had a restricted amount of material at their disposal and often based their designation of species on single specimens or, at most, a small series. They did not appreciate that the majority of corals show a considerable range of variations in skeletal characters. Thus, early taxonomic work led to an unnecessarily complicated situation that is still in the process of being disentangled today.

1. **Skeletal variation of poritid corals off Belize**— A multivariate statistical analysis is underway to characterize skeletal variation of *Porites* coral colonies off Belize; 73,380 measurements have been taken on 1165 colonies of this common coral. This research, conducted by LCDR Stephen Jameson, will provide a comparison baseline for future biochemical studies on taxonomy of this important coral genus.

Porites

FIELD WORK

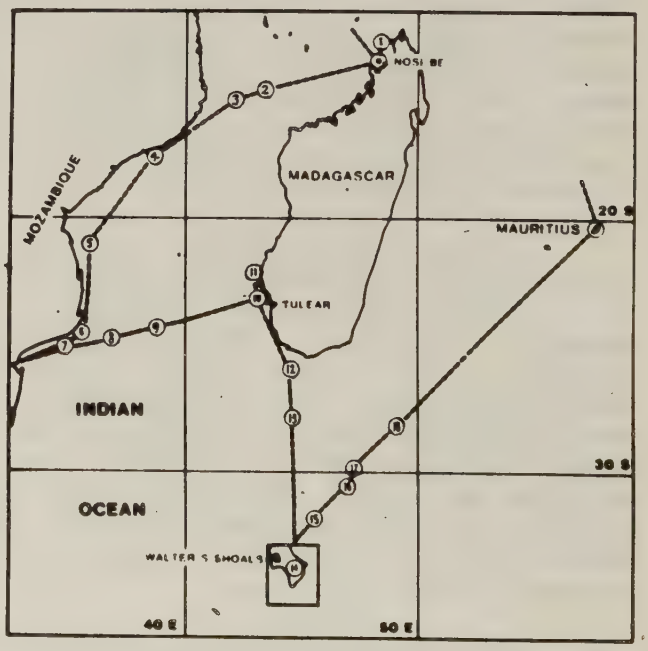
We participate actively in various field programs of the National Marine Fisheries Service and other organizations to obtain fresh material for our systematic research, to assist with identifications on board, and to obtain specimens to add to the national collections housed at the National Museum of Natural History. Our plans call for participation in two NMFS cruises per year, rotating among the four fishery centers. In 1988, half of the NSL staff participated in cruises.

1. **Center biologist spends two months on soviet vessel—** Thirteen ichthyologists from 7 countries, including Dr. Collette, participated in a research cruise on the Soviet oceanographic vessel *Vityaz* in the western Indian Ocean. The main purpose of the cruise was to collect deep-water fishes at depths ranging from 100 to 2500 m. Trawling was concentrated in the Mozambique Channel and south along the Madagascar Ridge to Walters Shoals. Material for ongoing taxonomic research projects on Spanish mackerels, frigate tunas, squids, penaeoid shrimps, herrings, and anchovies was collected. Representative specimens have been distributed to major museums throughout the world, including the U.S. National Museum of Natural History and Los Angeles County Museum of Natural History. Extensive collecting on Walters Shoals, a shallow seamount located 400 nautical miles south of Madagascar and 600 nm east of South Africa has led to preparation of a manuscript on its fish fauna with Dr. N. V. Parin, chief scientist of the *Vityaz* cruise.

2. **Museum collections from Groundfish Survey—** Three members of the Systematics Laboratory participated in the southern and George's Bank segments of the 1988 fall groundfish survey of the Northeast Fisheries Center. Besides working on sampling requirements of the survey, they collected specimens and data for on-going research projects on sand lances (*Ammodytes*), squids (*Loligo*), and flatfishes (*Symphurus*). Approximately 1000 specimens, representing 70 species of fishes and squids, were preserved and brought back to the Systematics Laboratory for identification and cataloguing into collections of the National Museum of Natural History.

3. **Cephalopods observed in-situ—** Dr. Vecchione participated in a 10 day cruise on R/V *Seward Johnson* in the Bahamas to observe and to collect pelagic cephalopods. Eighteen dives by the multidisciplinary team were made to depths as great as 3000 feet. Data were gathered on 15 species of cephalopods; 22 specimens were collected in exceptionally good condition (many were photographed alive on board), and 25 videotape sequences were recorded. Some species that are rare in trawl collections were seen to be common, and several behavior patterns not previously reported were observed.

4. **Second year of fieldwork completed in study of paralarval cephalopods of the Florida Current—** Together with scientists from the Smithsonian Institution, Dr. Vecchione is studying the planktonic paralarvae of cephalopods in the Straits of Florida. The study, funded by the Smithsonian Institution and conducted from the Smithsonian Marine Station in Fort Pierce, Florida, is planned to be a multi-year project. So far, fieldwork has consisted of two years of three-day cruises on the R/V *Sunburst*. The Straits of Florida are believed to be an important spawning ground for the commercially harvested short-finned squid, *Illex illecebrosus*. The taxonomy of adult *Illex* presently is confused, and currently it is impossible to identify paralarval *Illex* to species. Similar problems exist for other cephalopod genera off Florida, including the long-finned squid *Loligo*. Therefore, growth series will be assembled from the fresh material collected for this project to determine characters important for paralarval identification.



Vityaz
Cruise Track

SERVICE

In addition to their research responsibilities, scientists from the Systematics Laboratory serve the scientific community and the public in other ways as well. The primary service functions of this Laboratory are to provide expert identifications for groups of fishes, crustaceans, squids and corals in which we specialize, and to furnish information on these animals. We assist visitors in the use of the national collections. We review manuscripts for scientific publications, for colleagues in NMFS, and other agencies. Finally, we assist staffs of the divisions of Fishes, Crustacea, Mollusks and Echinoderms with curation and loans, especially of material collected by NMFS.

IDENTIFICATIONS

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Bernice P. Bishop Museum, Honolulu	A. Suzumoto, J. Randall
Blue Water Seafood, Garden Grove, CA	D. Aguilar
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Florida Dept of Natural Resources	J. Gartner
Florida Sea Grant	W. Rathjen
Ft. Lauderdale Pilot (newspaper)	J. Grogan
Georgia Southern College, Statesboro, GA	G. Bishop
Inst. für Meereskunde, Univ. Kiel, Germany	U. Piatkowski
Gulf Coast Research Lab., Ocean Springs, MS	R. Heard
Harbor Branch Oceanographic Institution, FL	R. Harbison, R. Gilmer
Houston Chronicle, TX	K. Moran
Hyman Phelps and McNamara, Washington, DC	J. Brunton
IFREMER	J. Quero
Inst. Invest. Pesquera, Spain	A. Guerra
Italexport, Rome, Italy	
L.J. Minor, Inc., Cleveland, OH	L. Best
Los Angeles County Museum of Natural History	R. Lavenburg, J. Martin
Maine Department of Natural Resources	R. Langton
Muséum National d'Histoire Naturelle, Paris	A. Crosnier
Nagasaki Univ., Japan	Y. Miya, Y. Natsukari
National Academy of Science	J. Swingle
National Geographic Society	D. Woodell, B. Norfleet, S. Wyerman, A. Kezerian, G. Diefenbacher
National Wildlife Federation	J. Pantz
Newfound Harbor Marine Inst.	J. Thomas
NMFS, Narraganset Laboratory	J. Casey
NMFS	W. Antozzi
NMFS, Honolulu Laboratory	B. Mundy
NMFS, Woods Hole Laboratory	J. Gibson
NMFS, La Jolla Laboratory	R. Charter, P. Kleiber
NMFS, Miami Laboratory	B. Schroeder
NMFS, Seattle Laboratory	B. Sinclair
Pan American Resources Int., S. A.	R. Pollock
PBS Station WNET	J. Hess
Pennsylvania State Univ., University Park	J. Bolz
Private sector	R. Crabtree
Rutgers University, NJ	K. Able

Rijksmuseum van Nat. Hist., Leiden	L. Holthuis
Santa Barbara Museum	F. Hochberg
Scripps Institution of Oceanography, CA	O. Walker
Smithsonian Institution	numerous contacts
Univ. Autónoma de México	R. Ramón
Univ. Hamburg	O. Giere
Univ. Hawaii	E. Chave
Univ. New England (Australia)	K. Rohde
Univ. Rhode Island	C. Recksiek
Univ. of the South, Sewanee, TN	R. Toll
Univ. Queensland	Tibbetts
Univ. São Paulo, Brazil	C. Magalhaes, N. Meneyes
Univ. South Florida, St. Petersburg	J. Briggs
Univ. Tel Aviv, Israel	B. Gallil
Univ. Washington Fisheries Research Institute	T. Mulligan
U.S. Customs Office, New York	T. Brady
U.S. Department of Agriculture	W. James
U.S. EPA Lab, Narragansett, RI	S. Springer
U.S. Food and Drug Administration, Washington, DC	M. Snyder
U.S. Fish and Wildlife Service, Washington, DC	J. Howarth
Vida Marina, S.A., Golfito, Costa Rica	M. Moore
Virginia Commonwealth University	M. Fine
Virginia Institute of Marine Science	J. Musick, J. Olney, G. Grant
Western Washington Univ., Bellingham	W. Summers
World Wildlife	S. Freely
Zaloom Bros., Seacaucus, NJ	

MANUSCRIPTS REVIEWED

Reviews of 33 manuscripts were provided for:

American Malacological Bulletin
Bulletin of Marine Science
Canadian Atlantic Reference Center
Canadian Journal of Zoology
Carnegie Museum of Natural History
Copeia
CSIRO - Division of Fisheries
Fishery Bulletin, U.S.
Journal of Crustacean Biology
Journal of Northwest Atlantic Fishery Science
Journal of Paleontology
Japanese Journal of Ichthyology
Museum National D'Histoire Naturelle, Paris
North Atlantic Fisheries Organization
NOAA Technical Reports
NMFS - Southeast Fisheries Center
Pakistan Journal of Science and Industrial Research
Proceedings of the Biological Society of Washington
Reviews in Aquatic Sciences
Smithsonian Contributions to Zoology
Smithsonian Translations Program
Transactions of the American Fisheries Society
USFWS, National Wetlands Research Center, Slidell, LA

Forty manuscripts were also reviewed for authors at their request.

RESEARCH PROPOSALS REVIEWED

Fourteen proposals were reviewed for the following organizations.

American Society of Ichthyologists and Herpetologists
Australian Research Council
Eastern Administrative Support Center
Eppley Foundation for Research
Hawaii Undersea Research Laboratory
Louisiana State University
Miami Dade Community College
National Geographic Society
National Science Foundation
Smithsonian Institution

PROFESSIONAL MEETINGS

AMERICAN FISHERIES SOCIETY, AMERICAN INSTITUTE OF FISHERY RESEARCH BIOLOGISTS

Dr. Collette attended the annual meeting of the American Fisheries Society in September in Toronto and presented an invited paper on grey literature at a symposium on scientific writing organized by the American Institute of Fishery Research Biologists. He also served on the AFS Publications Policy Committee.

AMERICAN MALACOLOGICAL UNION

Dr. Vecchione attended the annual meeting in Charleston, SC in June. He presented two papers, one on direct observation of cephalopods using manned submersibles, and the other on digestive-gland histology in paralarval squids.

AMERICAN SOCIETY OF ICHTHYOLOGISTS AND HERPETOLOGISTS

Drs. Munroe and Collette attended the annual meeting in Ann Arbor, MI in June and participated in the Board of Governors meeting. Dr. Collette served on the Raney Award Committee and as chairman of the Ichthyological Collections Committee. Dr. Munroe served as a judge in the competition for best student paper in Ichthyology.

CONGRESS OF EUROPEAN ICHTHYOLOGISTS

Dr. Collette was invited to present one of the five plenary lectures to the VI Congress of European Ichthyologists which met in Budapest in August. His presentation was entitled "The stability of classifications and phylogenetic uncertainty: Scombroidei, a case study".

AMERICAN LITTORAL SOCIETY

Dr. Collette was elected to the Advisory Board of the American Littoral Society and participated in one of the meetings of the Board.

ASSOCIATION OF SYSTEMATICS COLLECTIONS

Dr. Collette represented ichthyology and the American Society of Ichthyologists and Herpetologists at an ASC Workshop on Collections Resources for the 1990's held in Washington, D.C. in October. He surveyed the largest fish collections in the U. S. and Canada and prepared a report on the status of ichthyological collections.

AMERICAN SOCIETY OF ZOOLOGISTS

Dr. Williams participated in the annual meeting in San Francisco in December. He attended sessions of the Crustacean Society and the Society of Systematic Zoology. He was the co-author of a paper on fossil crabs from the Teepee Buttes of South Dakota.

NORTHEAST FISHERIES CENTER RESEARCH MEETING

The 4th Northeast Fisheries Center Research Meeting was attended by several members of the Systematics Laboratory staff in February, including Drs. Collette, Munroe, and Klein-MacPhee, as well as Ruth Gibbons and Martha Nizinski. Dr. Munroe presented a paper, co-authored by E. B. Hostetter of Old Dominion University, entitled "Age, growth and seasonal reproduction of tautog, *Tautoga onitis*, in Virginia", and Ms. Nizinski gave a presentation on "Ecological distribution, demography, and behavioral observations on *Periclimenes anthophilus*, an atypical symbiotic 'cleaner' shrimp".

UNIVERSITY AFFAIRS and TEACHING

BERMUDA BIOLOGICAL STATION

Dr. Collette taught a four-week course, "Biology of Fishes", to a class of 14 students from three countries at the Bermuda Biological Station in July. He also served on the Education Committee and was elected to membership in the Corporation of BBS.

NORTHEASTERN UNIVERSITY

Dr. Collette was reappointed as Adjunct Professor of Biology at Northeastern University and participated in the M. Sc. defense of one of his students studying food habits of several species of fishes in Massachusetts Bay.

OLD DOMINION UNIVERSITY

Dr. Munroe participated in the Master's Thesis defense of a student studying age, growth, and seasonal reproduction of tautog in Chesapeake Bay and coastal waters of Virginia.

VIRGINIA INSTITUTE OF MARINE SCIENCE/ COLLEGE OF WILLIAM AND MARY

Dr. Vecchione served as a member of the Associate Faculty. Dr. Collette served on the

committee of a graduate student studying the systematics of a western Atlantic halfbeak species complex (*Hyporhamphus unifasciatus*).

CORNELL UNIVERSITY

Dr. Collette provided data and advised a student on his senior honors thesis on heterochrony in jaw development in needlefishes (Belonidae).

UNIVERSITY OF SOUTH CAROLINA

Dr. Collette supervised a Smithsonian summer intern in vertebrate zoology from the University of South Carolina in a project on the systematics of a genus of freshwater Indo-West Pacific halfbeaks (*Hemirhamphodon*) and served on the student's senior honors thesis committee.

HARVARD UNIVERSITY

Dr. Collette was reappointed as Research Associate in the Department of Ichthyology, Museum of Comparative Zoology, Harvard University.

OTHER ACTIVITIES

FISHERY BULLETIN

Dr. Collette continued as a member of the Editorial Committee and the Outstanding Publications Committee.

SMITHSONIAN INSTITUTION

Drs. Collette and Munroe served as Research Associates in the Department of Vertebrate Zoology, Drs. Canet, Williams, and Vecchione in the Department of Invertebrate Zoology. Dr. Williams served as a member of the Oceanographic Sorting Center Arthropod Advisory Committee. Dr. Collette represented organizations affiliated with the Smithsonian on the Senate of Scientists and participated in an advisory study for the proposed reorganization of the National Museum of Natural History. Dr. Vecchione was a requested participant in planning meetings for permanent facilities at the Smithsonian Marine Station at Link Port (Harbor Branch Foundation) in Fort Pierce, FL.

BIOLOGICAL SOCIETY OF WASHINGTON

Dr. Williams served as President until the annual meeting in May. Dr. Collette participated in Council meetings and the annual meeting. Dr. Vecchione also participated in the annual meeting.

CEPHALOPOD INTERNATIONAL ADVISORY COUNCIL

Dr. Vecchione continued to serve as an elected member of the Council. Also, he participated in the International Workshop on the Systematics and Biogeography of Cephalopods described above.

AMERICAN FISHERIES SOCIETY/CRUSTACEAN SOCIETY

Dr. Williams is chairing a subcommittee of the Crustacean Society responsible for drafting a list of scientific and common names of decapod crustaceans from North America. Dr. Canet prepared the list of penaeoid shrimps. The list will be published by the American Fisheries Society to provide a checklist of species and to encourage acceptance of uniform common names.

FISHES OF THE WESTERN NORTH ATLANTIC

Dr. Collette continued to serve as Chairman of the Editorial Board of this monographic series. Part 9, covering the eels, will be published in two volumes by the Sears Foundation in 1989.

JOURNAL OF CRUSTACEAN BIOLOGY

Dr. Williams continued a 5-year term as an associate editor.

CYBIUM

Dr. Collette continued as a member of the editorial board of Cybium, Bulletin de la Societe Française d'Ichtyologie.

SOCIETY OF SYSTEMATIC ZOOLOGY

Dr. Williams has served as Secretary of SSZ for 4 years and Dr. Collette completed a 3-year term as a member of the Council. Dr. Collette also served on a committee to assess the status of the endowment fund of the Society.

WILLI HENNIG SOCIETY

Dr. Collette was elected to a 2-year term on the Council.

NATIONAL SYSTEMATICS LABORATORY PUBLICATIONS, 1988

Bishop, G. A.and A. B. WILLIAMS. 1988. Fossil crabs from the Teepee Buttes of South Dakota. Amer. Zool. 28(4):2A (abstract).

COLLETTE, B. B. and K. W. Hartel. 1988. An annotated list of the fishes of Massachusetts Bay. NOAA Tech. Memo. NMFS-F/NEC-51, 70 pp.

PEREZ FARFANTE, I. Illustrated key to penaeoid shrimps of commerce in the Americas. NOAA Tech. Rep. NMFS 64, 32pp.

VECCHIONE, M. 1988. Commercial fishing for gulf butterfish, *Peprilus burti*, in the Gulf of Mexico. Mar. Fish. Rev. 49(4):14-22.

VECCHIONE, M. 1988. *In-situ* observations on a large squid-spawning bed in the eastern Gulf of Mexico. Malacologia 29(1):135-141.

VECCHIONE, M. 1988. Variability in the distribution of late-stage oyster larvae in the Calcasieu Estuary. Contrib. Mar. Sci. 30:77-90.

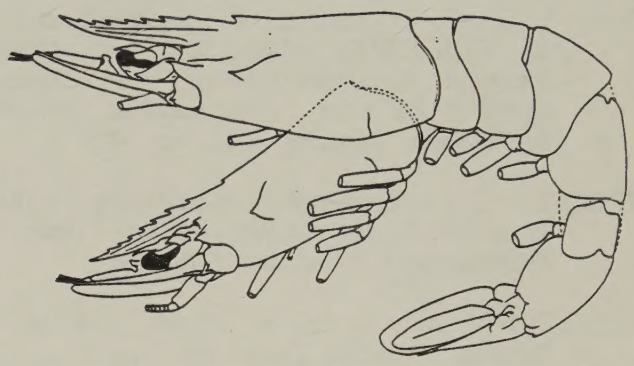
WILLIAMS, A. B. 1988. Notes on decapod and euphausiid crustaceans, continental margin, western Atlantic, Georges Bank to western Florida, USA. Fish. Bull., U.S. 86(1):67-76.

WILLIAMS, A. B. 1988. New marine decapod crustaceans from waters influenced by hydrothermal discharge, brine and hydrocarbon seepage. Fish. Bull., U.S. 86(2):263-287.

WILLIAMS, A. B. 1988. Conjoined twin adult shrimp (Decapoda: Penaeidae). Fish. Bull., U.S. 86(3):595-596.

WILLIAMS, A. B. 1988. Indo-Pacific spiny lobsters in the U. S. National Museum of Natural History, collected from 1963 to 1981. Crustaceana 55(3):313-316.

WILLIAMS, A. B., with collaboration of I. Dore. 1988. Lobsters of the world - An illustrated guide, lobsters of the world in U.S. trade. Osprey Books, Huntington, NY, 186 pp.



Conjoined Twin Adult Shrimp

IN PRESS

COHEN, D. M. Families Argentinidae, Bathylagidae, Melanonidae, Moridae, Gadidae, and Bregmacerotidae. *In:* Check-list of Fishes of the eastern Tropical Atlantic. J. C. Quero, ed., UNESCO.

COLLETTE, B. B. Family Scombridae. *In:* Check-list of Fishes of the eastern Tropical Atlantic. J. C. Quero, ed., UNESCO.

COLLETTE, B. B. and N. V. Parin. Families Belonidae and Hemiramphidae. *In:* Check-list of fishes of Eastern Tropical Atlantic. J. C. Quero, ed., UNESCO.

Felley, J. D., M. VECCHIONE, G. R. Gaston, and S. M. Felley. Habitat selection by demersal nekton: Analysis of videotape data. N.E. Gulf Sci.

Hanlon, R. T., S. v. Boletzky, T. Okutani, G. Pérez-Gandaras, P. Sanchez, C. Sousa-Reis, and M. VECCHIONE. Suborder Myopsida Orbigny, 1845. *In:* "Larval" and Juvenile Cephalopods. A Manual for Their Identification. M. J. Sweeney et al., eds.

MUNROE, T. A. A new species of deepwater tonguefish (*Symphurus*) from the eastern Pacific. Proc. Biol. Soc. Washington.

NIZINSKI, M. S. Ecological distribution, demography, and behavioral observations on *Periclemenes anthophilus*, an atypical "cleaner" shrimp. Bull. Mar. Sci.

Springer, V. G. and B. B. COLLETTE. Obituary: Robert H. Gibbs, Jr., 1929–1988. Copeia 1989(1).

Tyler, J. C., G. D. Johnson, I. Nakamura, and B. B. COLLETTE. Morphology of *Luvarus imperialis* (Luvaridae), with a phylogenetic analysis of the Acanthuroidei (Pisces). Smithsonian Contrib. Zool. No. 485.

VECCHIONE, M. Zooplankton distribution in three estuarine bayous with different types of anthropogenic influence. Estuaries.

VECCHIONE, M., C. F. E. Roper, and M. J. Sweeney. Marine flora and fauna of the northeastern United States. Mollusca: Cephalopoda. NOAA Tech. Rep. NMFS 73.

WILLIAMS, A. B. (Chairman). Common and scientific names of aquatic invertebrates from the United States and Canada. Decapod crustaceans. Am. Fish. Soc. Spec. Publ. 17.

WILLIAMS, A. B. and C. A. Child. Comparison of some genera and species of box crabs (Brachyura: Calappidae) of the southwestern North Atlantic with description of a new genus and species. Fish. Bull., U. S.

WILLIAMS, A. B. and P. J. B. Scott. A new species of coral-boring shrimp (*Upogebia*) from the West Indies (Decapoda: Upogebiidae). Proc. Biol. Soc. Washington.

Young, R. E., K. M. Mangold, and M. VECCHIONE. The enoploteuthid group of families. *In:* "Larval" and Juvenile Cephalopods. A Manual for Their Identification. M. J. Sweeney et al., eds.

COMPLETED MANUSCRIPTS

COLLETTE, B. B. Problems with grey literature in fishery science.

MUNROE, T. A. *Symphurus melanurus* Clark, a senior synonym for the eastern Pacific tonguefishes, *S. seychellensis* Chabanaud 1955 and *S. sechurae* Hildebrand 1946.

NIZINSKI, M. S., B. B. WASHINGTON, and B. B. COLLETTE. Separation of two species of sand lance (*Ammodytes americanus* and *A. dubius*) in the western North Atlantic.

VECCHIONE, M. Long-term trends in the abundance of the copepod *Acartia tonsa* in the Calcasieu Estuary.

VECCHIONE, M. Zooplankton of the Calcasieu Estuary.

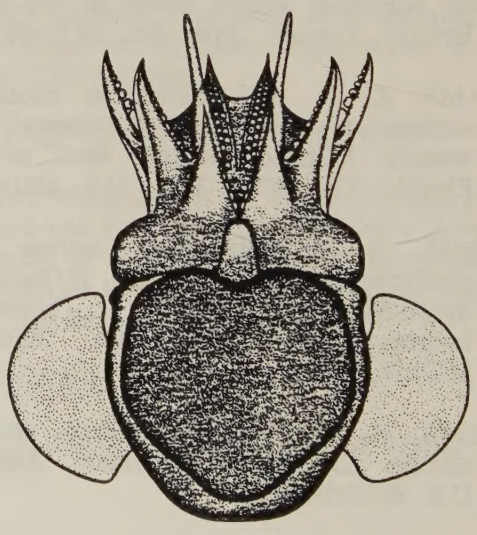
VECCHIONE, M. and V. A. Hand. Digestive-gland histology in paralarval squids (Cephalopoda; Loliginidae).

VECCHIONE, M. and K. L. Mayne. Larval distribution in an artificial estuary.

VECCHIONE, M., C. F. E. Roper, C. C. Lu, and M. J. Sweeney. Development, distribution, and relative abundance of paralarval cephalopods in the western North Atlantic.

Van Dover, C., and A. B. WILLIAMS. Egg size in squat lobsters (Galatheoidea): Constraint and freedom.

WILLIAMS, A. B. and K. Baba. New squat lobsters (Galatheidae) from the Pacific Ocean: Mariana Back Arc Basin, East Pacific Rise, and Cascadia Basin.



The Butterfly Bobtail Squid
Stoloteuthis leucoptera

STAFF

Bruce B. Collette	Laboratory Director and Ichthyologist
Isabel C. Canet (Pérez Farfante)	Carcinologist Emeritus
Thomas A. Munroe	Ichthyologist
Michael Vecchione	Squid Biologist
Austin B. Williams	Carcinologist
Stephen C. Jameson	LCDR, NOAA Corps and Corallist
Grace Klein-MacPhee	Fishery Biologist
Ruth E. Gibbons	Museum Specialist
Martha Nizinski	Museum Specialist
Arleen S. McClain	Administrative Assistant and Secretary
Keiko H. Moore	Scientific Illustrator
Virginia R. Thomas	Editorial Assistant
Betsy B. Washington	Zoologist
Lori Beullah	Museum Aide

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